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Socioeconomic inequalities in cause-specific mortality after disability retirement due to different diseases

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Abstract

Aims: Socioeconomic inequalities in both disability retirement and mortality are large. The aim of this study was to examine socioeconomic differences in cause-specific mortality after disability retirement due to different diseases.

Methods: We used administrative register data from various sources linked together by Statistics Finland and included an 11% sample of the Finnish population between the years 1987-2007. The data also include an 80% oversample of the deceased during the follow-up. The study included men and women aged 30-64 years at baseline and those who turned 30 during the follow-up. We used Cox regression analysis to examine socioeconomic differences in mortality after disability retirement.

Results: Socioeconomic differences in mortality after disability retirement were smaller than in the population in general. Manual workers nevertheless had a higher risk of mortality than upper non-manual employees after disability retirement due to mental disorders and cardiovascular diseases, and among men also diseases of the nervous system. After all-cause disability retirement, manual workers ran a higher risk of cardiovascular and alcohol-related death. However, among men who retired due to mental disorders or cardiovascular diseases, differences in social class were found for all causes of death examined. For women, an opposite socioeconomic gradient in mortality after disability retirement from neoplasms was found.

Conclusions: The disability retirement process leads to smaller socioeconomic differences in mortality compared to those generally found in the population. This suggests that the disability retirement system is likely to accurately identify chronic health problems with regard to socioeconomic status.

Key Words: Disability retirement, mortality, socioeconomic differences

Introduction

Low socioeconomic position is a known risk factor for mortality. According to previous studies (1-3), socioeconomic inequalities in mortality are persistently large in many countries. Such differences vary by cause of death, being particularly large in mortality due to cardiovascular diseases, stomach and lung cancer, COPD and pneumonia (4-6). Mortality due to breast cancer is higher in upper than lower socioeconomic classes (4, 6).

Socioeconomic differences in disability retirement are large (7-13). People of lower socioeconomic status run a higher risk of disability retirement than those of higher status. Large socioeconomic differences have been observed in disability retirement due to musculoskeletal diseases, cardiovascular diseases and psychoactive substance use (11). The differences have been smaller in disability retirement due to mental disorders, especially depression, as well as due to neoplasms (7, 11-12).

The risk of mortality is higher among disability retirees than among the general population. Studies from Norway and Sweden (14-17) show that the risk of all-cause mortality was 3 to 4 times higher among disability retirees compared to the general population. Mental disorders and musculoskeletal diseases are the main causes of disability retirement, but these diseases rarely lead to death. A previous study showed that disability retirees retiring due to musculoskeletal diseases ran a slightly higher risk of mortality than non-disability retirees (14). Disability retirement due to neoplasms, alcohol-related diseases, psychosis or respiratory and neurological diagnoses was accompanied by a higher risk of mortality (14, 18-19). A Finnish study (19) found socioeconomic differences in excess mortality after disability retirement due to depression and other mental disorders which varied by causes of death. However, not much is known about socioeconomic differences in mortality after disability retirement due to other reasons than mental disorders.

The aim of this study was to examine socioeconomic differences in mortality from the main causes of death after disability retirement due to different diseases among men and women. We set this aim in order to gain a better understanding of socioeconomic differences in disability

retirement and the role of comorbid conditions of underlying diseases leading to work disability and premature death.

Materials and methods

We used the administrative register data from various sources linked together by Statistics Finland. The data constitutes an 11% sample of the Finnish population between the years 1987-2007, with an 80% oversample of the deceased during the follow-up period 1988-2007. Analysis weights were used to account for the different inclusion probabilities among the deceased and the living. The study population included men and women aged 30-64 years at baseline and those who turned 30 during the follow-up. Age was classified into four groups: (1) under 35, (2) 35-44, (3) 45-54, (4) over 55 years at the beginning of the follow-up. The participants belonged to the labour force and were employed in 1987 or later during the follow-up. In calculating disability retirement rates, the follow-up started in 1988 or when the participant reached the age of 30. The follow-up ended at the end of 2007, or when retirement due to disability or other causes occurred, or the age for old-age retirement or death was reached. The follow-up time for mortality after disability retirement was calculated from the beginning of the retirement to the day of death.

Diagnostic causes of disability retirement

In the Finnish pension schemes, a medically confirmed diagnosis is required for disability pension. The diagnoses are classified according to the International Classification of Diseases (ICD-10). We used the following groups of diseases: musculoskeletal diseases (M00-M99), mental disorders (F10-F99), cardiovascular diseases (I00-I99), diseases of the nervous system (G00-G99) and neoplasms (C00-D48). Mental disorders were further classified into three subgroups: psychoactive substance use (F10-F19), schizophrenia (F20-F29) and depression (F32-F33). When examining mortality after disability retirement due to different diseases by causes of death, we pooled disability retirement due to mental disorders in one group and left disability retirees due to diseases of the nervous system out of the analysis due to the small number of deaths.

Socioeconomic status

Socioeconomic status was categorized according to the classification of Statistics Finland. We used the most recent information of socioeconomic status which was available in five-year intervals between 1970 and 2005. Socioeconomic status was classified into four classes: upper non-manual employees, lower non-manual employees, manual workers and self-employed persons.

Causes of death

Mortality data included causes of death based on ICD-10 classification between the years 1988-2007 from Statistics Finland. We used the following groups of causes: 1) neoplasms (C00-D48), 2) cardiovascular diseases (I00-I425, I427-I99), 3) other natural causes (A00-R99), excluding (I00-I99, C00-D48, F10, G312, G4051, G621, G721, K292, K70, K860, O354), 4) alcohol-related diseases and accidental poisoning by alcohol (F10, G312, G4051, G621, G721, I426, K292, K70, K860, K8600, O354, P043, X45) and 5) suicides and other unnatural causes (X60-X84, Y870, V01-X44, X46-X59, X85-Y86, Y871-Y89). The classification of causes of death differed from that for diagnostic causes of disability.

Statistical methods

We calculated the disability retirement rates by using the whole population as the standard population. The incidence of disability retirement was calculated by 1,000 person years in each socioeconomic group, separately for men and women. The mortality of disability retirees and non-disability retirees was calculated by dividing the number of deaths by 1,000 person years in each socioeconomic group, separately for men and women. Mortality rates were also calculated separately for disability retirees based on the different diseases.

Cox proportional hazard models were used to calculate hazard ratios (HR) and 95% confidence intervals for mortality after disability retirement due to different diseases and different causes of death during the period 1988-2007. The reference group was upper non-manual employees. The analyses were done separately for men and women. All models were age-adjusted. In calculations of mortality risk, interactions between socioeconomic status and disability retirement were tested. The socioeconomic differences in cause-specific mortality were

examined separately in four major diagnosis groups of disability retirement. The analysis was restricted to a comparison of manual workers to upper non-manual employees. We used proc phreg and proc lifetest procedures (SAS 9.3) for modelling the data and graphically evaluating proportionality of hazards.

Results

During the follow-up, 58,937 men and 52,289 women retired due to disability. Among the disability retirees, 24% of men and 13% of women died during the follow-up period 1988-2007. Table 1 shows the risk of disability retirement and mortality among disability retirees and non-disability retirees during the follow-up, by socioeconomic status. Disability retirement was more common in lower than in higher socioeconomic groups. Per 1,000 person years, 15 men and 16 women in the manual class, and 6 men and 5 women in the upper non-manual class retired due to disability.

Socioeconomic differences in mortality after disability retirement were modest. For men, mortality after disability retirement was slightly higher for manual workers (26 deaths/1,000 person years) than upper non-manual employees (24 deaths/1,000 person years). For women, mortality after disability retirement was slightly higher in upper non-manual employees (15 deaths/1,000 person years) than manual workers (13 deaths/1,000 person years). Among non-disability retirees, those in lower social classes clearly had the highest mortality rates. For both disability retirees and the general population, mortality rates of the self-employed resembled those of manual workers. The relative excess mortality among disability retirees compared to non-disability retirees varied by social class: among upper non-manual employees it was over 8-fold for men and 11-fold for women, and among manual workers around 4-fold for both men and women.

(Table 1 here)

Table 2 presents the disability retirement rates and mortality rates after disability retirement based on causes of disability for men and women. It also includes hazard ratios for socioeconomic differences in mortality after disability retirement due to different diseases. For men and women, the most common causes of disability retirement were musculoskeletal diseases and mental disorders, especially depression. The highest mortality rates were observed

among those who had retired due to neoplasms, psychoactive substance use, cardiovascular diseases or diseases of the nervous system. Small socioeconomic differences in mortality after disability retirement were found. A higher risk of mortality was found for those male manual workers who retired due to depression (HR=1.34; 95% CI 1.13-1.70), any mental disorders (HR=1.59; 95% CI 1.40-1.80), cardiovascular diseases (HR=1.23; 95% CI 1.09-1.39) or diseases of the nervous system (HR=1.33; 95% CI 1.06-1.68). For female manual workers the risk of mortality after disability retirement due to mental disorders (HR=1.21; 95% CI 1.00-1.47) and cardiovascular diseases (HR=1.33; 95% CI 0.97-1.84) was higher than for upper non-manual employees. However, among women who retired due to neoplasms (HR=0.85; 95% CI 0.72-0.99) or diseases of the nervous system (HR=0.71; 95% CI 0.50-1.05), the risk of mortality was lower for manual workers than for upper non-manual employees.

(Table 2 here)

Neoplasms and cardiovascular diseases were the most common causes of death after all-cause disability retirement (Table 3). Among male disability retirees, socioeconomic differences were found in mortality from cardiovascular diseases (HR 1.18; 95% CI 1.07-1.31 for manual workers compared to upper non-manual employees) and alcohol-related causes (HR 1.24; 95% CI 1.02-1.51). Non-disability retirees had much larger socioeconomic differences in mortality, and these were found for all of the examined cause of death categories.

Female manual workers had a lower risk of mortality from neoplasms (HR 0.67; 95% CI 0.59-0.76) and a higher risk of mortality from cardiovascular diseases (HR 1.35, 95% CI 1.08-1.71) after disability retirement than upper non-manual employees. Also regarding women, large socioeconomic differences were found for all causes of death among non-disability retirees. A slightly increased risk among manual workers was observed even for mortality from neoplasms, which was opposite to the gradient found among disability retirees.

(Table 3 here)

Among men, socioeconomic differences in mortality from each of the observed causes of death were found after disability retirement due to mental disorders. Compared to those with no disability retirement due to mental disorders, the magnitude of these differences was smaller in unnatural and alcohol-related causes and similar in natural causes of death. Among males retiring due to cardiovascular diseases, socioeconomic differences were only found for

mortality from neoplasms and cardiovascular diseases. Furthermore, the difference in cardiovascular mortality was much smaller than among those with no disability retirement due to cardiovascular mortality. There were no socioeconomic differences in mortality from any cause of death after disability retirement due to musculoskeletal diseases or neoplasms, which deviated from the clear differences found among non-disability retirement due to these diseases in each of the examined causes of death.

(Table 4 here)

Among women, only few socioeconomic differences in cause-specific mortality after cause-specific disability retirement were found. This may be because of the number of deceased in some causes of death after disability retirement due to different diseases was relative small. Increased mortality from cardiovascular diseases was nevertheless observed for manual workers after disability retirement due to mental disorders and cardiovascular diseases. Socioeconomic differences in mortality after disability retirement due to different diseases were smaller compared to non-disability retirees retiring due to these diseases, broadly for the same causes of death for women as for men, except for a reverse socioeconomic gradient in mortality from neoplasms after disability retirement due to neoplasms.

(Table 5 here)

Discussion

Our study shows that disability retirees have a higher risk of mortality than non-disability retirees. The risk of mortality was high overall after retirement due to psychoactive substance use, cardiovascular diseases, neoplasms, and diseases of the nervous system. However, socioeconomic differences in mortality after disability retirement were smaller than for non-disability retirees, and when examined by cause of disability, only a few associations were found. Socioeconomic differences in mortality after disability retirement due to mental disorders, cardiovascular diseases, and diseases of the nervous system were evident, showing that manual workers had a higher risk of mortality than upper non-manual employees.

In our analysis we used overall and cause-specific mortality to examine mortality after disability retirement due to different diseases. Socioeconomic differences after all-cause

disability retirement were largest in mortality from cardiovascular diseases and alcohol-related causes, although the differences also in these groups were clearly smaller than among non-disability retirees. Previous studies on the general population have also shown clear socioeconomic differences in mortality due to both cardiovascular diseases (5-6) and alcohol-related causes (20-21).

According to previous studies (11-12), socioeconomic differences in disability retirement due to mental disorders are small or non-existent and they vary by age and type of mental disorder. Our study found socioeconomic differences in mortality after disability retirement due to mental disorders especially among men, for which these differences were found in all causes of death. Causes of death after disability retirement due to mental disorders were almost as often unnatural as natural. In natural causes of death, the socioeconomic differences in mortality after disability retirement due to mental disorders were relatively similar to non-disability retirement due to mental disorders. Manual workers had a higher risk of mortality after disability retirement due to mental disorders. Factors contributing to socioeconomic differences in mortality after disability retirement due to mental disorders may also be similar than explanations in mortality as general. E.g. health behaviours are one of the main explanations for socioeconomic differences in mortality (22-23).

Socioeconomic differences in mortality from cardiovascular diseases and neoplasms after disability retirement due to cardiovascular diseases were found for men. However, these differences were smaller than among those with no disability retirement due to cardiovascular diseases. Natural causes of death, and especially cardiovascular diseases, were the most common causes of death after disability retirement due to cardiovascular diseases. Previous studies have found that socioeconomic differences in disability retirement due to cardiovascular diseases or cardiovascular mortality are evident. A large number of biological, behavioural, psychological and social factors is contributing to the association between socioeconomic status and mortality and morbidity of cardiovascular diseases (22). Factors like diet, smoking, alcohol consumption, physical activity, body mass index and cholesterol may have an effect on socioeconomic differences in disability retirement as well as on socioeconomic differences in mortality after disability retirement due to cardiovascular diseases.

Socioeconomic differences in all-cause and cause-specific mortality after disability retirement due to musculoskeletal diseases were non-existent, even if socioeconomic differences in disability retirement due to musculoskeletal diseases have been large (11,12). Causes of death

after disability retirement due to musculoskeletal diseases were in most cases neoplasm, cardiovascular diseases and other natural causes of death. Our results are in line with previous studies of mortality after long-term sickness absence, which show that people with a musculoskeletal diagnosis only have a somewhat elevated risk of mortality (24-25). Previous studies on disability retirement due to musculoskeletal diseases have shown that various kinds of working conditions constitute strong risk factors for disability retirement (26, 28). Work-related factors such as high physical workload, low job control and chemical and physical exposure at work contribute the most to socioeconomic differences in disability retirement (10,12,29,30). This may indicate that in the absence of work-related exposures, socioeconomic differences in mortality after disability retirement due to musculoskeletal diseases also decrease. Another reason for the non-existent socioeconomic differences in mortality after disability retirement due to musculoskeletal diseases may be the small number of disability retirees in the upper socioeconomic classes. Those upper-non manual employees who have retired due to musculoskeletal diseases may have more serious illnesses. Among manual workers, less serious musculoskeletal diseases may lead to work disability more often than among non-manual employees.

Socioeconomic differences in mortality after disability retirement due to neoplasms for men were non-existent. However, the results for women showed that upper non-manual employees had a higher risk of mortality from neoplasms after disability retirement for the same reason. Previous studies (4,28) on mortality from neoplasms and breast cancer in general have shown that there are small socioeconomic differences in mortality. E.g. the upper socioeconomic classes have had a higher risk of mortality from breast cancer (28). The reasons for the finding of the current study on an inverse socioeconomic gradient in the mortality of neoplasms after disability retirement for women are unclear. One explanation may be that upper non-manual employees have better opportunities to continue working longer regardless of their illness. Those upper non-manual employees who are retired on a disability pension may have more serious illnesses and therefore a poorer prognosis of survival.

The present population-based study has several strengths. The data include an 11% sample of the Finnish population and 80% of all of the deceased during a 20-year follow-up period, 1988-2007. All information, including records on retirement, mortality and a broad range of diagnoses, is derived from reliable national registers with little missing data. However, in some disease groups the number of deceased was relative small.

Conclusions

There were socioeconomic inequalities in mortality after disability retirement due to mental disorders and cardiovascular diseases. Looking at causes of death, socioeconomic differences in mortality from cardiovascular diseases, alcohol-related causes and neoplasms after disability retirement were evident. Among female disability retirees, manual workers had a lower risk of mortality from neoplasms than upper non-manual employees which was opposite to the association found among female non-disability retirees. Disability pension is awarded on the basis of medically confirmed diseases leading to a significant reduction in the person's work ability. To the extent that we observe smaller socioeconomic differences in cause-specific mortality after disability retirement, our results may suggest that the disability retirement process is likely to equitably identify chronic health problems in all socioeconomic groups.

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Table 1. Number of disability retirements (DR), deaths and person years for disability retirees and non-disability retirees by socioeconomic status and gender.										
	Disability retirement			Mortality of disability retirees			Mortality of non-disability retirees			Mortality of
Men	disability	person	DR/1000	person	deaths/1000		person	deaths/1000		
	retirements	years	person years	deaths	years	person years	deaths	years	person years	(DR/Non-DR)
upper non-manual	5489	1001502	5.5	1236	52597	23.5	3016	1045722	2.9	8.1
low er non-manual	9028	959837	9.4	2054	86443	23.8	4007	975062	4.1	5.8
manual w orkers	34451	2290597	15.0	8366	324200	25.8	13873	2170057	6.4	4.0
self-employed	9969	858854	11.6	2501	97201	25.7	5746	904057	6.4	4.0
All	58937	5110790	11.5	14157	560441	25.3	26642	5094898	5.2	4.8
Women	disability	person	DR/1000	person	deaths/1000		person	deaths/1000		
	retirements	years	person years	deaths	years	person years	deaths	years	person years	(DR/Non-DR)
upper non-manual	4132	884660	4.7	547	37790	14.5	1186	912591	1.3	11.1
low er non-manual	20075	2314818	8.7	2566	196580	13.1	4393	2351415	1.9	7.0
manual w orkers	21675	1351811	16.0	2877	230269	12.5	4718	1380374	3.4	3.7
self-employed	6407	518547	12.4	880	68615	12.8	1973	577924	3.4	3.8
All	52289	5069836	10.3	6870	533254	12.9	12270	5222304	2.3	5.5

Table 2. Incidence of disability retirement and mortality after disability retirement by cause of disability. Hazard ratios for mortality after disability retirement by socioeconomic status (SES).										
	Disability	Mortality after disability	Hazard for mortality by SES after disability retirement							
Cause of disability	retirement	retirement	(ref.=upper non-manual)							
retirement	DR/1000	death/1000	low er non-manual		manual workers		self-employed			
	person years	person years	HR	95 % CI	HR	95 % CI	HR	95 % CI		
MEN										
Depression	1.02	17.74	1.16	0.92-1.47	1.34	1.13-1.70	1.23	0.96-1.59		
Psychoactive substance use	0.35	66.14	0.87	0.63-1.21	0.95	0.73-1.25	0.82	0.57-1.17		
Schizophrenia	0.42	14.79	0.98	0.56-1.72	1.19	0.78-1.93	1.24	0.74-2.15		
All mental disorders	2.57	21.94	1.11	0.96-1.28	1.59	1.40-1.80	1.26	1.08-1.48		
Musculoskeletal diseases	3.65	15.15	1.03	0.84-1.28	1.14	0.95-1.39	1.09	0.90-1.34		
Cardiovascular diseases	1.98	32.12	1.03	0.89-1.18	1.23	1.09-1.39	1.16	1.01-1.33		
Neoplasms	0.51	144.67	1.02	0.85-1.22	1.03	0.88-1.20	1.01	0.85-1.21		
Nervous system	0.70	30.36	1.26	0.96-1.68	1.33	1.06-1.68	1.23	0.94-1.63		
All	11.53	25.26	1.01	0.95-1.09	1.10	1.04-1.17	1.07	1.00-1.14		
WOMEN										
Depression	1.44	7.84	0.89	0.67-1.20	1.05	0.79-1.42	1.04	0.70-1.52		
Psychoactive substance use	0.09	50.10	1.57	0.83-3.20	1.32	0.72-2.65	2.38	1.08-5.36		
Schizophrenia	0.42	9.09	0.77	0.44-1.45	0.93	0.54-1.74	0.95	0.48-1.95		
All mental disorders	2.87	9.12	1.01	0.84-1.22	1.21	1.00-1.47	1.19	0.92-1.53		
Musculoskeletal diseases	4.11	6.90	0.95	0.74-1.26	1.04	0.81-1.36	1.02	0.78-1.37		
Cardiovascular diseases	0.82	16.38	1.15	0.85-1.60	1.33	0.97-1.84	1.01	0.72-1.43		
Neoplasms	0.62	123.99	0.94	0.81-1.09	0.85	0.72-0.99	0.89	0.74-1.08		
Nervous system	0.48	16.92	0.74	0.52-1.09	0.71	0.50-1.05	0.78	0.50-1.22		
All	10.31	12.88	0.90	0.82-0.99	0.86	0.78-0.94	0.88	0.79-0.98		

MEN		Cause of death									
		Neoplasms		Cardiovascular		Other natural		Alcohol- related		Unnatural	
		HR	95 % CI	HR	95 % CI	HR	95 % CI	HR	95 % CI	HR	95 % CI
disability retirement due to any cause	upper non-manual	1		1		1		1		1	
	low er non-manual	1.02	0.90-1.16	1.05	0.93-1.18	0.99	0.83-1.19	0.98	0.78-1.24	0.94	0.76-1.17
	manual w orkers	1.01	0.91-1.13	1.18	1.07-1.31	1.07	0.91-1.24	1.24	1.02-1.51	1.09	0.91-1.31
	self-employed	1.06	0.94-1.20	1.21	1.08-1.36	1.04	0.87-1.25	0.87	0.69-1.11	0.89	0.72-1.11
	unw eighted deaths	15014		19017		7655		5256		5779	
No DR	upper non-manual	1		1		1		1		1.00	
	low er non-manual	1.2	1.09-1.31	1.42	1.31-1.54	1.29	1.12-1.49	1.81	1.54-2.14	1.50	1.34-1.68
	manual w orkers	1.5	1.39-1.61	2.03	1.90-2.18	1.95	1.74-2.20	3.52	3.07-4.04	2.98	2.72-3.29
	self-employed	1.2	1.11-1.31	1.74	1.62-1.87	1.45	1.27-1.66	1.7	1.44-2.01	1.9	1.70-2.13
	unw eighted deaths	23355		35577		10728		9758		19090	
	SES*DR	p<0.000		p<0.000		p<0.000		p<0.000		p<0.000	
WOMEN		Cause of death									
		Neoplasms		Cardiovascular		Other natural		Alcohol-related		Unnatural	
		HR	95 % CI	HR	95 % CI	HR	95 % CI	HR	95 % CI	HR	95 % CI
disability retirement due to any cause	upper non-manual	1		1		1		1		1	
	low er non-manual	0.82	0.72-0.93	1.14	0.91-1.45	0.96	0.77-1.22	0.96	0.63-1.50	0.84	0.61-1.17
	manual w orkers	0.67	0.59-0.76	1.35	1.08-1.71	0.95	0.76-1.20	1.2	0.80-1.86	0.84	0.62-1.18
	self-employed	0.77	0.67-0.89	1.31	1.02-1.69	0.92	0.70-1.20	0.78	0.45-1.33	0.82	0.55-1.21
	unw eighted deaths	12090		5932		4420		1233		1879	
No DR	upper non-manual	1		1		1		1		1	
	low er non-manual	1.06	0.97-1.17	1.51	1.32-1.73	1.37	1.15-1.65	1.57	1.18-2.12	1.35	1.13-1.63
	manual w orkers	1.12	1.02-1.23	2.15	1.88-2.46	1.76	1.48-2.11	3	2.26-4.04	2	1.66-2.41
	self-employed	1.06	0.95-1.19	1.94	1.69-2.25	1.5	1.24-1.84	1.63	1.13-2.35	1.44	1.14-1.80
	unw eighted deaths	17863		13621		6714		2302		4881	
	SES*DR	p<0.000		p<0.000		p<0.000		p<0.000		p<0.000	

Table 4. Socioeconomic differences in mortality from different causes of death after disability retirement due to different diseases, men.

		Cause of death									
		Neoplasms		Cardiovascular		Other natural		Alcohol-related		Unnatural causes	
		HR	95 % CI	HR	95 % CI	HR	95 % CI	HR	95 % CI	HR	95 % CI
DR due to mental disorders	upper non-manual	1		1		1		1		1	
	manual w orkers	1.44	1.07-1.98	1.82	1.43-2.33	1.8	1.28-2.60	1.65	1.26-2.19	1.32	1.03-1.70
	unw eighted deaths	1255		2370		1159		1981		2280	
No DR due to mental disorders	upper non-manual	1		1		1		1		1	
	manual w orkers	1.51	1.42-1.61	1.9	1.79-2.01	1.88	1.72-2.08	3.22	2.85-3.65	2.5	2.29-2.74
	unw eighted deaths	37114		52224		17224		13033		22589	
SES*DR		0.7747		0.1009		0.5466		0.0026		0.0001	
DR due to musculoskeletal diseases	upper non-manual	1		1		1		1.00		1	
	manual w orkers	1.13	0.82-1.60	1.21	0.89-1.69	0.98	0.62-1.66	1.01	0.58-1.93	1.27	0.73-2.44
	unw eighted deaths	3468		4190		1490		921		1170	
No DR due to musculoskeletal diseases	upper non-manual	1		1		1		1		1	
	manual w orkers	1.58	1.48-1.68	2.04	1.92-2.15	2.02	1.84-2.23	3.21	2.87-3.61	2.51	2.30-2.73
	unw eighted deaths	34901		50404		16893		14093		23699	
SES*DR		0.1759		0.0007		0.0015		0.0001		0.0001	
DR due to cardiovascular diseases	upper non-manual	1		1		1		1.00		1	
	manual w orkers	1.44	1.07-1.97	1.18	1.01-1.37	1.12	0.77-1.67	1.86	0.94-4.29	1.26	0.77-2.18
	unw eighted deaths	2127		7762		1171		441		686	
No DR due to cardiovascular diseases	upper non-manual	1		1		1		1		1	
	manual w orkers	1.51	1.42-1.61	1.93	1.82-2.05	1.94	1.76-2.13	3.08	2.75-3.45	2.38	2.19-2.60
	unw eighted deaths	36242		46832		17212		14573		24183	
SES*DR		0.9557		0.0001		0.0721		0.4363		0.0093	
DR due to neoplasms	upper non-manual	1		1		1		1.00		1	
	manual w orkers	1	0.85-1.17	1.48	0.70-3.71	1.16	0.44-4.00	1.17	0.29-8.37	1.2	0.41-4.93
	unw eighted deaths	5554		278		118		55		97	
No DR due to neoplasms	upper non-manual	1		1		1		1		1	
	manual w orkers	1.51	1.41-1.61	1.91	1.81-2.03	1.91	1.74-2.10	3.05	2.73-3.42	2.33	2.18-2.54
	unw eighted deaths	32815		54316		18265		14959		24772	
SES*DR		0.0001		0.581		0.7436		0.5455		0.5798	

Table 5. Socioeconomic differences in mortality from different causes of death after disability retirement due to different diseases, women.

	Socioeconomic status	Cause of death									
		Neoplasms		Cardiovascular		Other natural		Alcohol-related		Unnatural causes	
		HR	95 % CI	HR	95 % CI	HR	95 % CI	HR	95 % CI	HR	95 % CI
DR due to mental disorders	upper non-manual	1		1		1		1		1	
	manual w orkers	0.94	0.67-1.37	1.88	1.22-3.06	1.26	0.80-2.09	1.32	0.80-2.30	0.98	0.67-1.47
	unweighted deaths	1172		974		730		611		1062	
No DR due to mental disorders	upper non-manual	1		1		1		1		1	
	manual w orkers	1.14	1.06-1.24	2.06	1.84-2.33	1.74	1.50-2.01	2.89	2.23-3.82	1.75	1.47-2.09
	unweighted deaths	28781		18579		10404		2924		5698	
	SES*DR	0.5992		0.2714		0.6237		0.0161		0.0076	
DR due to musculoskeletal diseases	upper non-manual	1		1		1		1.00		1	
	manual w orkers	0.98	0.67-1.49	0.98	0.64-1.61	1.38	0.66-3.38	1.07	0.36-4.92	2.08	0.66-11.91
	unweighted deaths	2441		1648		453		190		352	
No DR due to musculoskeletal diseases	upper non-manual	1		1		1		1		1	
	manual w orkers	1.19	1.10-1.29	2.25	2.00-2.53	1.84	1.60-2.14	2.91	2.30-3.73	1.74	1.48-2.05
	unweighted deaths	27512		17681		9986		3345		6408	
	SES*DR	0.7676		0.0005		0.0072		0.3096		0.6639	
DR due to cardiovascular diseases	upper non-manual	1		1		1		1.00		1	
	manual w orkers	1.06	0.61-2.00	1.5	1.00-2.37	1.38	0.66-3.38	0.68	0.13-8.15	0.66	0.21-2.95
	unweighted deaths	681		1648		453		50		101	
No DR due to cardiovascular diseases	upper non-manual	1		1		1		1		1	
	manual w orkers	1.14	1.06-1.23	2.06	1.83-2.34	1.73	1.50-2.00	2.77	2.19-3.54	1.64	1.40-1.94
	unweighted deaths	29272		17905		10681		3485		6659	
	SES*DR	0.6279		0.0032		0.7438		0.2215		0.3679	
DR due to neoplasms	upper non-manual	1		1		1		1.00		1	
	manual w orkers	0.84	0.72-0.99	1.22	0.43-4.70	0.61	0.19-2.49	0.51	0.06-6.90	0.81	0.15-7.66
	unweighted deaths	6557		140		89		18		37	
No DR due to neoplasms	upper non-manual	1		1		1		1		1	
	manual w orkers	1.12	1.03-1.22	2.09	1.87-2.35	1.75	1.53-2.03	2.76	2.18-3.53	1.62	1.38-1.91
	unweighted deaths	23396		19413		11045		3517		6723	
	SES*DR	0.0001		0.7416		0.3485		0.4398		0.4557	